

Louse Powder Test at Ezbe Ramesses II

Ezbe Ramesses consists of a small cluster of homes lying just west of the Colosses of Ramesses which lies in supreme majesty beneath a protecting canopy on the site of the ancient Egyptian city of Memphis. Officially Ramesses belongs to the jurisdiction of the ^{newly} village of Mit Ribana where the USATC began its experimental vaccinations early in Feb. 1. ER was chosen under the mistaken impression that it is a village of $100 \pm$ people. The first survey gave 55 persons but these had dwindled to about 40 by the time we started to work on Louse Powdering.

Louse Powder M.R. - Application to lower ~~scans~~ ^{assess}.

Feb 7th - JCS and FLS working. Visit of Sadek and Assis. Clothing 37 people examined and powdered.

Feb 10th - Examination of clothes of 34 people by JCS

FLS and CMW showed 5 adult lice on garments of 5 women. No complaints of dermatitis on body or scalp.

Feb 13-14 - Examination of clothes of 29 people by JCS FLS -

CMW showed 9 adult lice on six people and 69 immature forms* on 12 people. Continued action of larvicide on young forms is suggested by finding ① dead larva on the garments of 5 persons with living larvae and ② on the garments of 12 persons in which killing of second generation had apparently been complete; ③ visible traces of powder along the seams of many garments. * This figure is incomplete on 2 garments of two cases in which uncontrolled hatching was occurring were not fully examined. 11 nymphs of head lice were found in one case.

1943

Feb. 17 and 21. Clothes were examined by CMW of 32 people on Feb 17 and 12 adult lice found on 10 people; 98 immature forms were found on the clothing of 19 people. Larvae were found on 10 people not having adults; only one adult was found on person not having larvae.) On Feb 21 the clothing of 13 persons was examined, ~~the~~ ~~of~~ 3 negatives from the 17th and one other. 5 adults were found on two people, and 15 larvae on 4 people. ~~Two~~ persons were found louse free! 2nd Powdering given on 21 st to 33 persons,

Feb 25. Clothing of 14 examined by CMW and only 2 found infested, one with 2 adults and one with 1 adult and 1 late larva.

Traces of powder were visible on 13 of 14 person's clothing and adult and late larva on second case, though living were not actual live.

Feb 28. Clothes of 28 people examined by JCS CMW and FLS finding 6 adults on 5 persons and 10 larvae on 6 persons. No evidence of infestation was found on 19 persons.

March 4th. JCS CMW FLS examined and powdered (3rd time) clothing of 25 persons. Only 7 adult lice were found on 6 persons and only 6 immature forms on five persons. 17 persons were apparently free of infestation.

March 15th. JCS, CMW and FLS examined ²⁹ people: 12 persons found infected. 12 larvae on inner garments 8 persons 1 larva on outer garment of another person. 17 adults on inner garments of 9 persons and 2 adults on 2 other people. People c larva 9, c adults 11. Total persons infested 14. These results are disappointing coming as they do one week after the third powdering which was expected to almost do away with young forms in this group.

Table I

MAR 12

L A. Family 1 Heads of 1, 4, 5, 6 shaved. First days dusting was done
 ① 0 at the house of the caretaker but the women on Feb 10th and all
 0 ④ persons on succeeding days were handled at home of Fam-
 ③ ③ ily 1.

0 (15+)

⑦ ③

⑥ ①

② ②

② ④

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0 0 Family 2. #5 11 and 14 sick w/ typhus; to hospital on Feb 7. Varroa from 14. 14 returned on
 ① 0 21st apparently free of lice; 11 returned, lousy, on the 25th but was powdered
 0 0 only on the 7th. #11 undoubtedly a source of reinfestation of
 0 0 family during 10 days. 60 dead from clothing of case
 0 ① 14 on Feb 7th at Hospital.

0 0

0 ①

0 0 Family 3. Evidently some advantages to living alone.

0 0 Family 4. No adult lice found on clothing of #5 19 and 21 but nits on
 -- clothing of 21.

0 0

⑦ 0

0 0

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0 0

		3 Days after 1st Powder	One week after 1st Powder	10 days after 1st Powder	4 days after 1st Powder	One week after 1st Powder	2 Weeks after 1st Powder				
		FEB 7	FEB 10	FEB 13/14	FEB 17	FEB 21	FEB 25	FEB 28	MAR 4	MAR 15	MAR 22
		B	H	L	A	L	A	L	A	L	A
29 F	35	++	0	0	0	0	0	④	①	--	--
30 M	3	+	+	0	0	0	0	③	0	+	--
31 M	2	+	+	0	0	0	0	0	0	0	0
32 F	9	3	+	0	0	0	0	0	⑨	0	① ①
35 M	50	3	+	0	0	0	0	⑨	0	① ③	+
36 F	45	1	+	0	0	--	0	0	0	① 0	0
39 M	19	2	+	0	0	0	0	②	0	+	--
40 M	10	0	+	0	0	0	0	①	① 0	+	--
41 F	2	1	+	+	0	0	0	②	0	+	--

TABLE II

Ex	Pos.	Persons Found		NUMBER
		L	A	
3 or 7	34	32	32	++
		32	32	++
10	32	1	4	1
IWK-13	29	11	6	63
		11	6	72*
2WK	{ 17	32	19	10
	17	19	97	12
		19	97	102*
	17	13	4	13
		13	2	15
			5	20
25	14	2	1	3
IWK-28	23	6	4	10
		6	4	5
2WK	7	25	5	6
		5	6	7
			7	12
IWK-15	29	10	9	17
		10	9	16
2WK-22	26	9	10	26
		9	10	30†
			11	64

(* The numbers given for the 13th and 17th ^{FEB.} are incomplete since only part of some garments (heavily infested in comparison with others) was examined.)

In passing it may be noted that on Feb 7th 60 lice were picked with ease from the clothing of patient Case #14 for its isolation of virus.

ON MARCH 22, COUNT ON OUTBREAK WAS GIVEN AS 15+.

① NOTE THAT EXAM OF EX 21 WAS LIMITED TO NEGATIVES OF FEB 17TH.

March 22 JCS and CMW examined clothing of 26 per.
 done 14 days after powdering. 23 Larvae on Inner
 garments of 7 persons and 30+ adults on clothing of 8 persons
 3 young forms on outer clothing of 3 persons and 5 adults 27
 on outer clothing of 4 persons. New Eggs seen as well as
feces of freshly fed young larva. 13 of 26 persons infected.

DISCUSSION: A REARRANGEMENT OF DATA OF TABLE II
FOLLOWS AS TABLE III:

DUSTING	PERIOD AFTER DUSTING									LICE		
	3 TO 4 DAYS			ONE WEEK			TWO WEEKS			3-4 DAYS	ONE WEEK	TWO WEEKS
	EX	CL	CA	EX	CL	CA	EX	CL	CA			
FIRST	32	1	4	29	11	6	33	13	12	5	72+	129+
SECOND	14	2	1	28	6	4	25	5	6	4	15	13
THIRD	0	-	-	29	10	9	26	9	10	-	33	61+

The results of the 3 day examination of clothing after the First Dusting indicated considering the great intimacy of contact with villagers from Muktiha that the louse kill had been almost perfect. The absence of young forms indicated that killing power continued for 48 hours or more. Examination at the end of the week however showed many young forms and indicated insufficiency of powder action and too short persistence of killing action in clothing to get all young forms. From these results it was concluded that by using a 14 day interval between dustings it should be possible to get almost total kill after not more than 3 applications. The second application of powder gave results in keeping with this expectation: the 4 day count on 14 people was low; the one week count on 22 people was better.

One Garment Index:	Garment from skin outwards.			
	First	Second	Third	Fourth
Feb 10	1	2	2	0
13	9	4	0	0
17-21	24	2	2	0
25	2	0	0	0
28	5	1	1	0
MAR 7	6	3	0	1
MAR 15	11	3	—	—
MAR 22	10	6	—	—

Table IV
Infestations (persons) missed by examination of first garment only:

	L	M	Pearce
Feb 10	0	4	4
13	2	0	2
17-21	1	0	1
25	0	0	0
28	1	0	1
MAR 7	1	1	2
MAR 15	1	1	2
MAR 22	2	1	3

There is some reason for thinking that most of the infestations missed by 1st garment inspection are "pick-ups" from off the garments. On Sat 10th, 3 days after the first powdering, 4 of 5 infestations found were on outer garments, and consisted of no adult lice. On the 25th 4 days after the second powdering, when total lice in bedding etc must have been greatly reduced, no infestations of this type were found. In any case evidence indicates that only very light infestations will be missed by doing only inner garments.

Then that following the first dusting and the 2 week count following the second dusting gave grounds for the hope that the 3rd treatment would finish the job since there was no increase between one and two week counts and no evidence of active breeding. The small number of larvae found may very well have come from chance contaminations. The period of two weeks seemed to have been adequate to let most of nits hatch out and yet not long enough to let those which hatched lay eggs for a third generation. No 3 day count was made after the 3rd treatment but the one week and two

²⁹
week counts show that the 2nd treatment failed to check
the infestation - increasing infestation was appar-
ent.

April 5. CMW and JCS made 4 week count (after 3rd
dusting) ²⁴ Persons ex: 14 with larva, ¹⁶ with lice.

April 8. JCS and CMW decide to test out theories for failure
of dusting to give desired results: ① that alteration in
method of application may have altered effect and ② that re-
infestation from immediate surroundings, bed, etc. may
be serious. ③ that variation in shipments of Dic and Feb
may be responsible. P All inhabitants of village had beds
(beds), bedding and clothing powdered & all but 1 person
sleeping in village were treated. Work was done house to
house.) 60 cans, (120 oz) were used on 34 persons; the
rubber sheet "poof" technique was used on clothing. Repeat
mode not to wash clothing during coming two weeks.
P Powder from Feb 9th Mgt shipment was used on four
children ^{JCS camp} #1 Family for special observation.

April 12 - Four day counts at Rammell: 28 Persons, 14 with
lice: 10 with larva forms. Clearly apparent that
"poof" technique with present powder is not equal
to s-a-n technique and powder in Feb. 1/3 children main-
tain heavy infestations; treated today with sprinkle + poof
① with seams + poof + ③ seams only.

April 15th. JCS + CMW.: 30 Persons, 16 with lice, 12 = larva.

Children in Special Test still heavily infested, 4 Chil-
dren given special test with different powders & both gave

April 17 - No change in garments of 4 children.

JCS CMW
APR 21 - JCS dusted 1 with Feb lot 80, other with Dec lot 04.

April 22 - JCS CMW - Methyl Bromide application to 32 People - Counts on 31 People, 24 c lice, 20 larval. Testson Birth lot and Feb lots show loss of potency.

April 26. JCS CMW: 28 counts; 16 with lice, 12 c larval.

May 4th JCS CMW and FEB: 30 counts: 19 c lice, 14 c larval

May 11th JCS CMW and FEB: 31 counts, 22 c lice, 21 c larval.

Discussion:

Table VI

POWDER FEB 7	EXAM. IN ED.	WITH LICE	WITH LARVAE	WITH LOT	NOTES
3 DAY FEB 10	32	5	1	0	most all lice and some eggs
1 WK FEB 13-4	29	13	11	5	but extensive hatching began before the end of the first week.
2 WK FEB 21	33	25	22	4	Second powder got
<u>POWDER FEB 21</u>					
4 DAY FEB 25	14	2	1	0	most of reinfestation and
1 WK FEB 28	28	9	6	0	little or no hatching en-
2 WK MAR 7	25	8	6	0	sued during the follow-
<u>POWDER MAR 7</u>					ing two (3) weeks. Third
1 WK MAR 15	29	12	19	0	powder had some effect but
2 WK MAR 22	26	13	9	2	much less than first two and
4 WK APR 5	28	19	14	7	4th Powder which was the
<u>POWDER APR 8</u>					most thorough of all was
4 DAY APR 12	28	14	10	3	a dismal failure. Methyl
1 WK APR 15	30	16	13	6	Bromide results are bad.
2 WK APR 22	31	23	20	10	but will be discussed under
<u>METHYL BR. APR 22</u>					Bidder Report.
4 DAY APR 26	28	16	12	6	May 18. CMW JCS and
12 DAY MAY 4	30	19	15	5	31. S. counts plus
19 DAY MAY 11	31	22	21	12	powder, homemade mix
26 DAY May 18	30	25	22	16	with 325 mesh. Failed.
<u>MYL + TALC MAY 18</u>					Powder seemed very
1 DAY MAY 19	28	11	10	9	

fluffy to use but one day killing will have to
be determined since immediate killing does not
occur. May 19. Counts by CMWJCS-2D. Eleven pos-
itives in 28 persons. (Many lice found took anem-
ic. Does this indicate late killing?)

See FINAL REPORT - LOOSE LEAF BOOK.

(Dr Typhus, Egypt, file, No. 6)

March 22, 1944
Malaria
Typhus
Lice

III

Louse Powder Studies. Outline for Log Feb 12 1943

Effect on ① Free living forms) @ Body lice
② Eggs } ③ Head lice

modified by Clothing

① Cotton } @ as killing of lice
② Wool }
③ Oriental } ④ as to production of
④ Occidental } dermatitis

Will powder kill lice in hair of both men and women? What about cloth braided in with hair?

Questions of Special Interest

① How fast will louse powder alone bring down louse infestation to point below threshold of typhus transmission?

② Will rapid destruction of lice cause immediate cessation of transmission or must some substance be added to powder which will kill rickettsia on clothing and in louse feces?

③ If powder kills free living forms but not eggs, when should second application be made to get the maximum result so the next generation before further egg laying can occur?

- (4) How many applications of powder and at what intervals must be used to guarantee complete delousing of an isolated individual? Of an isolated closed group population?
- (5) How rapidly can mass infestation be reduced by mass application or distribution of powder to entire population by inspector or nurse working from house to house?
- (6) How rapidly can thorough application of powder render refugees, or other infested and infected groups innocuous to other groups with which they mingle?
- (7) What is maximal result to be obtained when every one in a community gets a single application of powder?
- (8) How frequently must powder be applied for safety when large percentage of population is powdered? When minimal portion of population is powdered?
- (9) What index of infestation can be used to get rapid survey of infestation? Examination of mole and dren?
- (10) Are the characteristics which cause a powder to pack when shaken the same as those which

favor its clinging to garment fabric?

(1) How should powder be applied? Shaker, powder blower, envelope or fluffing into garment itself?

(2) How combine greatest efficiency with economy in the use of the powder?

(3) Can powder be perfumed to make it more attractive and to facilitate its recognition on re-examination?

(4) What is effect of powder on other vermin especially fleas? Bed bugs?

(5) Will head lice reinfect body if body lice are removed, and vice versa?

(6) Can Head Lice transmit Rickettsia?

Many of the questions cited overlap and answers to some will come in the course of tests carried out to answer others.

IV

Answers and Partial Answers. May 31 43

Fully effective Myf makes a pretty complete kill and has some ovicidal action as well as some delayed action in killing young as they hatch.

Myf can be used on heads for head lice without danger.

① At Rides very little typhus occurred after the 16th or 17th day after the first mass dusting.

② Apparently killing of lice rather than killing of vector in feces is important in blocking epidemic wave.

③ Undetermined: 14 days has been used but possibly 10 days would be better.

Questions for North Africa:

1. Are local rodents susceptible? Monkeys?
2. Natural flea infections with epidemic virus?
3. What species of flea can transmit rickettsiae?
4. Does vaccinated case which contracts typhus circulate virus?
5. Does perspiration affect lice unfavorably?